

6061-TG T. 750 Y.058W

| Work Order ID January-21-13 9:08:2. | | | *958 | 376* | | | | | | Page 1 |
|--|------------------------------------|--------------------------------------|----------------------|--------------------------|------------|--------------|---------------|-------------------|------------------|----------------|
| Item ID: D2973 Revision ID: | | | Accept | *N900 | 040 | 100 |)* s | etup Star Stop | I VI | S1* |
| | Bolt Spacer | +0 4: | L | | | | | Stop | *N | S2* |
| Start Date: 1/16/1 Required Date: 1/30/1 | | *24 ¹ *24 ¹ | | Cust Item I Customer: | D: | | | | | |
| Reference: | | 7- | | | | | | _ | | |
| Approvals: Proc | ess Plan: ML5 | Date: 13-01-7 | Z Tooling: | Da | ate: | | R | tun Star | 1/1 | R1* |
| QC: | | Date: | SPC (Y/N): | Da | ate: | | | Stop | , *N | R2* |
| Sequence ID/ Work Center ID | Operation Description | | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
| Draw Nbr | Revision Nbr | | | | | | | | | |
| D2973 | Rev A | | | | | | | | | |
| 100 | | | 0.00 | 11 | | | | | | |
| *100* Hardinge | Memo | | 0.00 | AS is | 3-01-2 | 8 | 24 | - D | · | - |
| Hardinge CNC Lathe Small | TURN AS P DWG REV: FOLIO REV | | FB096 | | | | | | | .• |
| 105 | QC2- Inspect parts off m | achine FAI/FAIB | 0.00 | | | | | | | |
| *105* | | | | A 13. | . 40 | | 24 | | | |
| QC Quality Control | Memo | ₹, . | 0.00 | A 13. | -01-60 | | | | | |
| *107 *107* | QC8- Inspect parts - seco | and check | 0.00 | 3.1 | · 28 | | 24 | | | |
| QC QC | Memo | | 0.00 | | | | | | | |

| NCR: | Yes | 1 | No |
|------|-----|---|----|

DQA:

Date:

| NCR: | CR: Yes / No WORK ORDER NON-CONFORMANCE / UPDATE QA Closed: Date: | | | | | | | | | | | | |
|---|--|---------------------|-----------|--------------------|----------|------------------------------|----------|---|-------------------------------|--------------------|-----------------------------|-------------------------------------|---------------------------|
| | | | | | | DISPOSITION | | | | AGAINST DE | | | |
| Nork Ord | er: | | | | | | , I | | | | | | |
| Part I | No. | | | | | Rework Scrap Use-as-is | | Skid-tube Crosstube Machining Small Fab Thermoforming Finishing | | | | Water Jet J. Eng. Coor. e/Packaging | Engineering Quality Other |
| NCR I | No. | | | | | Work Order Update |] | Large Fab Composite | | | ince/stor | | |
| Root | | | | | Descri | ption of work order update | | nitial | Ac | tion | Sign & | | |
| Cause | | Date | Step | Qty | | or Non-conformance | Ch | ief Eng | Desc | ription | Date | Verification | QC Inspector |
| oc/Data | | | | | | | | - | | | | | |
| quip/Tooling | | | | | | | | | | | | | · |
| perator | | | | | | | | | | | | | 1 |
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| napproved | | · | L | | | | | T CATE | | | | | |
| | | | | | | | AUL | T CATE | ORY | | | | |
| Landi | <u> </u> | | | | | General | | lc: | | _ | Ovalized | | Pressure/Forced |
| | _ | Bending | | | \ | Bend BOM/Route | \vdash | Grain | | <u> </u> | | <u>+-1</u> | Temperature/Cure |
| | <u> </u> | Centre No | or Concer | ונווכ נס נ |)/3 - | BOM/Route Broken/Damaged | \vdash | Hardwa | | <u> </u> | Over/Under Part Incorred | - | Weld |
| | - | Cracks Crushed/0 | Crimnad | | - | Burrs | \vdash | 1 | on Incomplete ons Incomplete/ | /Unclose | Part Lost/Mi | | Wrong Stock Pulled |
| | _ | Cuffs | crimpea. | | ⊢ | Contamination | \vdash | Mainte | • | Gilclear | Part Moved | 231118 <u></u> | |
| | _ | Heat Trea | .+ | | - | Countersink | \vdash | Mislabe | | | Positioned V | drong | |
| | | Inspection | | Tubo | | Cut Too Short | \vdash | Misread | | | Power Loss/ | | Other |
| | \vdash | 1 | | IUDE | \vdash | Drill Holes | | Offset | | <u>L_</u> | J. OWEL COSS/ | L | Totaler |
| Ripples in Bend Drill Holes Torque Waves in Extrusion Drawing | | | | Out of Calibration | | | | | | | | | |
| | \vdash | Turning Se | | | · - | Finish | | 4 | equence | | | | |
| | \vdash | Wave/Tw | | | - | Folio | | 1 | Dimensions | | | | |

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

130

Quality Control

| Work Orde January-21-13 | | | | *958 | 376* | | | | | Page 2 |) |
|--|-------------------|--|--------------------|------------------------------|--------------------------|------------|--------------|--------------------|-----------------|------------------------------|---|
| Item ID: Revision ID: Item Name: | D2973 Cross Bo | olt Spacer | <u> </u> | Accept | *N900 | 040 | 100 |)* | Setup Star | 17.21 | |
| Start Date: Required Date: Reference: | 1/16/13 | Start Qty: 24.00 | *24* *24* | | Cust Item I Customer: | D: | | | | 14()/ | |
| Approvals: | | ss Plan: | Date: | Tooling: SPC (Y/N): | | ate: | | | Run Star | "INK1" | |
| Sequence ID/ Work Center II 120 *120* Packaging Packaging | D | Operation Description Identify as per dwg & Sto Memo ***STOCK | ck Location: 26 | Set Up/ Run Hours 0.00 | Tool ID | Tool # | Plan Code | Accep Qty 24 | t Reject Qty | Reject Insp. Number Stamp | |
| 130 | | QC21- Final Inspection - | Work Order Release | 0.00 | | | | | 1 | 1. 0 | |

0.00

Memo

131 St

| | | | | | | | | DQA: | Date: | |
|---------------|--|--|-----|---------------|---|-----------------------------------|-----------------------|--------------------|------------------|-----------------|
| NCR: Y | es / No | | | | WORK ORDER NON-C | ONFOR | MANCE / UPDATE | • | | |
| | | | | | | | | QA Closed: | Date: | |
| Work Orde | r· | | | | DISPOSITION | | AGAINST | DEPARTMENT | PROCESS | |
| ···ork orac | | | | | Rework | Rework Skid-tube Crosstub | | | Water Jet | Engineering |
| Part N | o | | | | Scrap | | Machining Small Fab | Pro | d. Eng. Coor. | Quality |
| | | | | | Use-as-is | Use-as-is Thermoforming Finishing | | Rec/Stor | e/Packaging | Other |
| NCR N | 0 | | | | Work Order Update |] [| Large Fab Composite | | Supplier | |
| 0 | | | 1 | D | | la idia l | A -4: | Cian O | | |
| Root Cause | Date | Step | Qty | l | ption of work order update or Non-conformance | Initial Chief Eng | Action Description | Sign & Date | Verification | QC Inspector |
| oc/Data | Date | Step | Qty | | or Non-comormance | Cillet Elig | Description | Date | Verification | QC Hispector |
| quip/Tooling | - | | | | | | | | | |
| perator | | | | | | | | | | |
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| Other | , | | | | | | | | | |
| rocess | | | | | | | | | | |
| upplier [| | | | | | | | | | |
| raining | | | | | | | | | | |
| Jnapproved | | <u> </u> | | | | | | | | |
| | | ···· | | | F. | AULT CATE | G()RY | | | |
| Landin | g Gear | | | _ | General | | : | _ | | 7 |
| 1 | Bending | | | | - | Grain | | Ovalized | | Pressure/Forced |
|] | Centre Not Concentric to O/S BOM/Route | | | - | Hardwa | | Over/Under | - | Temperature/Cure | |
| 1 | Cracks Broken/Damage | | | 1 | — — | ion Incomplete | Part Incorre | | Weld | |
| ļ | Crushed/Crimped. Burrs | | ╡ | \vdash | tions Incomplete/Unclear | Part Lost/Mi | ssing | Wrong Stock Pulled | | |
|] | | | | Contamination | Mainte | | Part Moved | | | |
| j | Heat Treat Counter | | | Countersink | Mislabe | eled | Positioned Wrong | | | |

Misread

Out of Calibration

Out of Sequence

Outside Dimensions

Offset

Cut Too Short

Drill Holes

Drawing

Finish

Folio

Power Loss/Surge

Other

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Inspection Strip in Tube

Torque Waves in Extrusion

Picklist Print

January-21-13 9:08:23 AM

95876

Work Order ID: Parent Item:

D2973

Parent Item Name:

Cross Bolt Spacer

Start Date: 1/16/13

Required Date: 1/30/13

Page 1

Start Qty: 24.00

Required Qty: 24.00

Comments:

IPP A00.05.18New IssueEC

IPP REV:B NOW ON HARDINGE 12.02.28

112652

| Component Item ID/ Item Name | Replacement Item ID | Mfg/ Purch | Bin Item | Primary Location | Last Location | Route Seq ID | Unit of Measure | Qty on Hand | Qty per Kit | Total Qty | Qty Issued | Date Issued | Status |
|--|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|----------------|-------------|----------------------|---------------|----------------|--------|
| M6061T6T0.750W.058 6061-T6 RD Tube .750 x.0 | 058W | Purchased | No | | | 100 | f | 90.9000 | 0.2896 | . 7.3162104 . 916 | | H13-0 | 01-28 |
| | | | | <u>Location</u> | | Loc Qty | Lo | c Code | | | | | |
| | | | | MAT015 | | 90.9 | | | | | | | |
| | | | | 100 | 99 | 36 | | | _5.3 | 33 | | | |

54.9

| | | | | - | | | | | | | DQA: | Date: | , |
|--|----------|--|----------|------|---|---|----------|---|--|---------------------------|--|--------------|---|
| NCR: | Yes | / No | | | | WORK ORDER NON- | COI | NFORM | AANCE / UPI | DATE | | | |
| | | | | | | | | , | | | QA Closed: | Date: | |
| Work Ord | er. | | | | | DISPOSITION | | | | AGAINST DE | PARTMENT | /PROCESS | |
| Part No. NCR No. Root Des | | | | | Rework Scrap Use-as-is Work Order Update | Machining Small Fab Thermoforming Finishing | | Water Jet Prod. Eng. Coor. Rec/Store/Packaging Supplier | | Engineering Quality Other | | | |
| Root | | | | | Descri | ption of work order update | | Initial | Act | ion | Sign & | | |
| Cause | | Date | Step | Qty | (| or Non-conformance | Ch | nief Eng | Descr | iption | Date | Verification | QC Inspector |
| Doc/Data Equip/Tooling Operator Material Setup Other Process Supplier Training | | è | | | | | | | | | | | |
| Unapproved | <u> </u> | | <u> </u> | l | <u> </u> | | <u> </u> | LT CATE | CORY | | 1 | | 1 |
| Landi | ng (| Gear | | | | General | 701 | - CATE | <u> </u> | | | | |
| Landi | | Bending Centre No Cracks Crushed/ Cuffs Heat Trea | Crimped. | | o/s | Bend BOM/Route Broken/Damaged Burrs Contamination Countersink | | -1 ' | ion Incomplete tions Incomplete/U enance | Jnclear | Ovalized Over/Under Part Incorre Part Lost/M Part Moved Positioned N | ct | Pressure/Forced Temperature/Cure Weld Wrong Stock Pulled |
| | \vdash | Inspectio | | Tube | - | Cut Too Short | - | Misread | | | Power Loss | | Other |

Offset

Out of Calibration

Out of Sequence

Outside Dimensions

Drill Holes

Drawing

Finish

Folio

Ripples in Bend

Torque Waves in Extrusion

Turning Sequence

Wave/Twist in Tube

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

| DART AEROSPACE LTD | Work Order: | 95874 |
|-------------------------------|--------------|-------------|
| Description: (ross bolt speak | Part Number: | D2973 |
| Inspection Dwg: D2973 Rev: A | | Page 1 of 1 |

FIRST ARTICLE INSPECTION CHECKLIST

| Drawing Dimension | Tolerance | Actual Dimension | Accept | Reject | Method of Inspection | Comments |
|-------------------------|------------------------------|---------------------|--------|--------|-------------------------|----------|
| \$.750 | 4/010 | ,750 | 1 | | 5608 | Ven |
| \$.750 3.475 .058 | +/010 +.030/-0.0 +/010 | 3.490 | V | | l V | |
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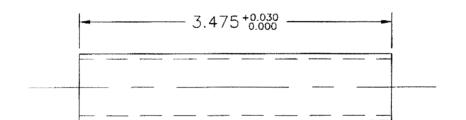
| | n 1 | | OA). | | |
|--------------|----------|-------------|---------|-----------------------|--|
| Measured by: | 11 | Audited by: | 04 | Preliminary Approval: | |
| Date: | 13-01-28 | Date: | 13.1.28 | Date: | |
| | | L | | | |

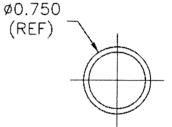
| Rev | Date | Change | Revised by | Approved |
|-----|----------|----------------------------|------------|----------|
| E | 10.04.14 | Added preliminary approval | KJ | L |



| DESIGN | DRAWN BY | DART AEROSP | VACE USA, | INC. |
|---------|--|-------------------|-----------|-----------|
| CHECKED | APPROVED | DRAWING NO. | | REV. A |
| # | - Q | D2973 | SHE | ET 1 OF 1 |
| DATE | ************************************** | TITLE | | SCALE |
| 00.03 | .13 | CROSS BOLT SPACER | ₹ | 1:1 |
| Α | 00.03.13 | NEW ISSUE | | |







MATERIAL: 6061-T6 (WW-T-700/6) 0.750 DIA. \times 0.058 WALL TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED

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